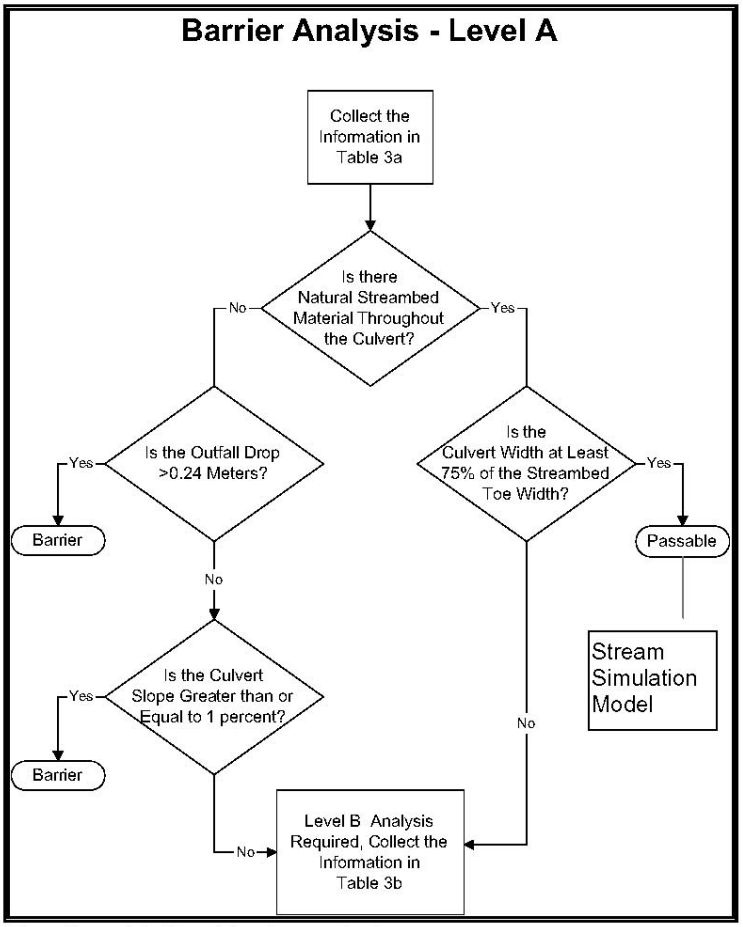
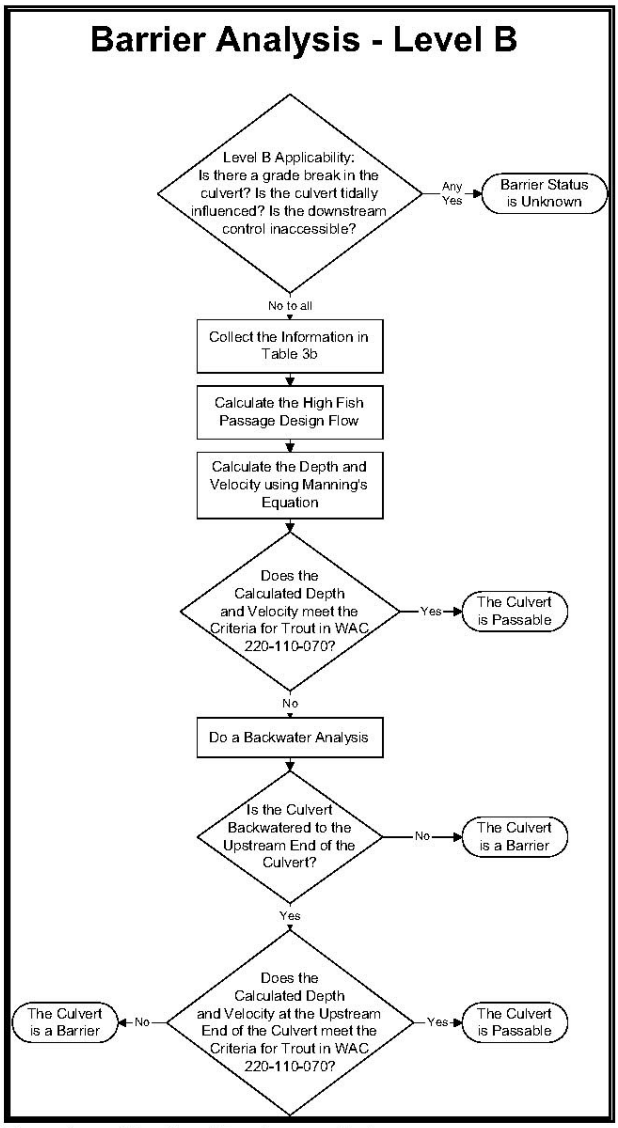
Appendix B:

Level A, Level B, and Stream Simulation Model Forms

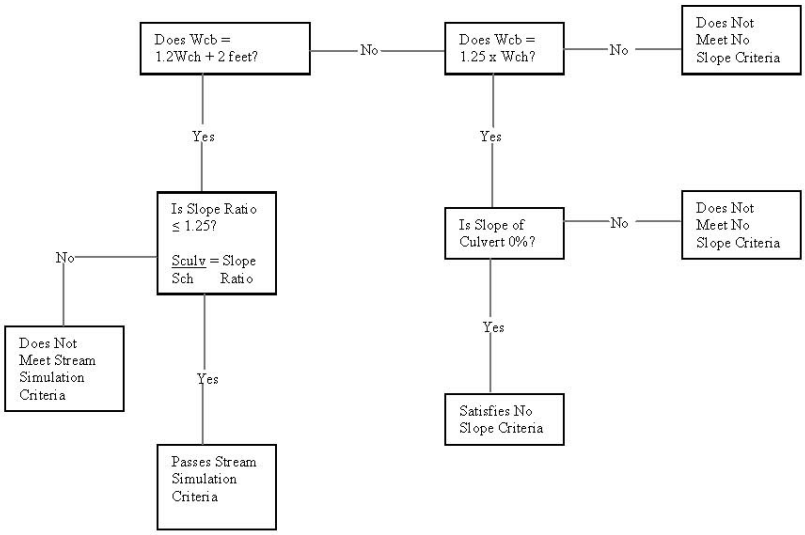


Flow chart of the Level A culvert analysis.



Flow chart of the Level B culvert analysis.

Stream Simulation Model / No Slope Model



Model for Stream Simulation Criteria / No Slope Assessment

Abbreviations:
Sculv = Slope of culvert
Sch = Slope of channel
Wcb = Width of culvert bed
Wch = Width of bankfull channel

Appendix C:

Priority Index Model

Fish Passage Priority Index

The variety in costs, amounts of habitat gain, and species utilizing potential project sites throughout Washington State can make the characterization and prioritization of corrections to fish passage barriers complex. The WDFW Fish Passage Inventory process uses a Priority Index model to consolidate the many factors which affect a project's feasibility (expected passage improvement, production potential of the blocked stream, fish stock health, *etc.*) into a manageable framework for developing prioritized lists of projects. The result is a numeric indicator giving each project's relative priority that includes production benefits to both anadromous and resident salmonid species adjusted for sympatric species interactions (species complexes). The Priority Index (PI) for each barrier is calculated as follows:

$$PI = \sum_{all\ species} \sqrt[4]{[(BPH) \times MDC]}$$

Where:

PI = Fish Passage Priority Index

- Relative project benefit considering cost.
- The PI is actually the sum ($\sum_{all\ species}$) of individual PI values, one of which is calculated for each species present in a stream (*e.g.*, PI_{coho} is added to PI_{chum} to obtain $PI_{all\ species}$).
- The quadratic root in the equation is used because it provides a more manageable number and represents a geometric mean of factors used.

B = Proportion of passage improvement

- Proportion of fish run expected to gain access due to the project (passability after project minus passability before project); gives greater weight to projects providing a greater margin of improvement in passage.
- Barriers are assumed to be partial and have a value of 0.67. Modifications to this approach can be applied with advanced levels of expertise.

P = Annual adult equivalent production potential per m^2

- Estimated number of adult salmonids that can potentially be produced by each m^2 of habitat annually.
- The values (adults/m^2) are species specific; chinook salmon = 0.016, chum salmon = 1.25, coho salmon = 0.05, pink salmon = 1.25, sockeye salmon = 3.00, steelhead =

0.0021, bull trout/Dolly Varden = 0.0007, searun cutthroat trout = 0.037, resident cutthroat/rainbow trout = 0.04, brook trout = 0.04, and brown trout = 0.0019.

H = Habitat gain in m^2

- Measured/calculated from physical survey; gives greater weight to projects which will make greater amounts of habitat available.

- Spawning area values used for species complexes normally limited by spawning habitat (sockeye, chum, and pink salmon) and rearing area values used for species complexes normally limited by rearing habitat [(coho salmon, searun cutthroat, chinook salmon, and steelhead) and (resident cutthroat/rainbow trout and bull trout/Dolly Varden) and (brook and brown trout)].

- When more than one species within a species complex is present H is modified to reflect sympatric interactions among species with similar freshwater life histories. The result is a reduction of single species habitat area values when competing species coexist.

M = Mobility Modifier

- Accounts for benefits to each fish stock for increased mobility (access to habitat being evaluated); gives greater weight to projects that increase productivity of species that are highly mobile and subject to geographically diverse recreational and commercial fisheries by providing access to habitat currently limiting productivity.

  2 = Highly mobile stock subject to geographically diverse recreational and commercial fisheries (anadromous species).

  1 = Moderately mobile stock subject to local recreational fisheries (resident species).

  0 = Increased mobility of stock would have negative or undesirable impacts on productivity or would be contrary to fish management policy. By default, exotic salmonid species such as brook trout and brown trout are assigned a 0 value unless they are the only salmonid species present in the system.

D = Species Condition Modifier

- Representation of status of species present; gives greater weight to less healthy species as listed in the *Washington State Salmon and Steelhead Stock Inventory (SASSI)* report (WDF *et al.* 1993) and *Washington Salmonid Stock Inventory, Bull Trout/Dolly Varden* (WDFW 1997). In the absence of a SASSI assignment, stock condition should be estimated using the best available information.

  3 = Condition of species considered critical.

2 = Condition of species considered depressed or stock of concern.

1 = species not meeting the conditions for 2 or 3.

C = Cost Modifier

- Representation of projected cost of project; gives greater weight to less costly projects.

  3 = incremental funds needed ≤ $100,000.

  2 = incremental funds needed >$100,000 and ≤$500,000.

  1 = incremental funds needed >$500,000.

- All barriers receive a cost modifier value of 2 until engineering evaluations are completed.

The information from the fish passage priority index that resides in the fish passage and screening database is shown in Table 17.

Table 17. WDFW fish passage and screening database (SSHEARBase) attribute descriptions for the fish passage priority index. Attribute values in bold text are mandatory choices.

Attribute	Description
B	B – Proportion of passage improvement. Values can range between 0.1 and 1.0. This value is based on the % Passability estimate made for barrier features. A total barrier would have a value of 1 indicating a 100% improvement in fish passage if the barrier were corrected. Based on current barrier assessment methodologies input values should be; 0% passable – **1.0**, 33% passable – **0.67**, 67% passable – **0.33**. These values can vary between species for a given barrier reflecting different swimming strengths.
P	P– annual adult equivalent production potential per m^2. Values are species specific. This is a read only field with the values being programed into the form.
H	H – gain in production habitat (m^2) above a barrier. This value is taken from the adjusted production area table in the habitat assessment spreadsheet.
M	M – mobility modifier. Values include; **2** (anadromous species), 1 (resident species), and **0** (species whose increased mobility would have negative impacts to native species such as brook trout and brown trout). Default values have been programed into the form. They can be changed if conditions require.
D	D – stock condition modifier. Valid entries include; **3** (stock status critical), **2** (stock status depressed or of concern), or 1 (stock status not meeting the conditions for 2 or 3).
C	C – cost modifier. Valid entries include; **3** (estimated project cost ≤ $100,000), **2** (estimated project cost >$100,000 and ≤ $500,000, or 1 (estimated project cost >$500,000).
PI Species	Species specific PI value. Read only, calculated by form.
PI Total	Sum of all species specific PI values. Read only, calculated by form.

Appendix D:

Big Quilcene River Priority Index Calculation

WDFW Fish Passage and Diversion Inventory Database

Barrier Priority Index Report

Site ID: 1310028 Electric Weir at Quilcene NFH

Stream: Big Quilcene R **Trib To: Hood Canal** **WRIA: 17.0012**

	B	H	M	D	C	Species PI
Sockeye			2		2	
Pink	0.67	8,122	2	2	3	16.90
Chum	0.67	9,291	2	1	3	14.70
Coho	0.67	29,518	2	1	3	8.78
Chinook			2		2	
Steelhead	0.67	29,518	2	1	3	3.97
Searun Cutthroat	0.67	29,518	2	1	3	8.14
Resident Trout	0.67	33,376	1	1	3	7.21
Dolly/Bull Trout			1		2	
Brook			0		2	
Brown			0		2	
				TOTAL PI		**59.70**

B = proportion of fish passage improvement (1, 0.67, 0.33).
H = potential habitat gain (square meters), spawning habitat for sockeye, pink and chum, rearing habitat for the rest.
M= mobility modifier (anadromous = 2, resident = 1, invasive =0).
D = stock condition modifier (critical = 3, depressed = 2, not 2 or 3 = 1).
C= repair cost modifier (<$100K = 3, $100K - $500K = 2, >$500K = 1).

WDFW - SSHEAR
Physical Survey Summary of Information

Stream Name:	Big Quilcene River
Tributary To:	Hood Canal
WRIA #:	17.0012
Site ID:	1310028

Filename(s):

1	1310028.xls	6	
2		7	
3		8	
4		9	
5		10	

Species present:

1	Chum	7	
2	Pink	8	
3	Searun Cutthroat	9	
4	Resident Cutthroat/ Rainbow trout	10	
5	Coho	11	
6	Steelhead		

Length Surveyed (m):

Primary Stream:	5584	m
1st tributary:		m
2nd tributary:		m
3rd tributary:		m
4th tributary:		m
5th tributary:		m
6th tributary:		m
7th tributary:		m
8th tributary:		m
9th tributary:		m
Total Length Surveyed (m):	**5584.00**	**m**

Spawning area (m²):

Primary Stream:	13766.39	m²
1st tributary:		m²
2nd tributary:		m²
3rd tributary:		m²
4th tributary:		m²
5th tributary:		m²
6th tributary:		m²
7th tributary:		m²
8th tributary:		m²
9th tributary:		m²
Total Spawning Area (m²):	**13766.39**	**m²**

Rearing area (m²):

Primary Stream:	33375.82	m²
1st tributary:		m²

	2nd tributary:		m²
	3rd tributary:		m²
	4th tributary:		m²
	5th tributary:		m²
	6th tributary:		m²
	7th tributary:		m²
	8th tributary:		m²
	9th tributary:		m²
	Total Rearing Area (m²):	**33375.82**	**m²**

Chum	Primary Stream:	8122.17
Adjusted Production Area:	1st tributary:	
	2nd tributary:	
	3rd tributary:	
	4th tributary:	
	5th tributary:	
	6th tributary:	
	7th tributary:	
	8th tributary:	
	9th tributary:	
	Total Adjusted Production Area:	**8122.17**

Pink	Primary Stream:	9291.19
Adjusted Production Area:	1st tributary:	
	2nd tributary:	
	3rd tributary:	
	4th tributary:	
	5th tributary:	
	6th tributary:	
	7th tributary:	
	8th tributary:	
	9th tributary:	
	Total Adjusted Production Area:	**9291.19**

Searun Cutthroat	Primary Stream:	29517.57
Adjusted Production Area:	1st tributary:	
	2nd tributary:	
	3rd tributary:	
	4th tributary:	
	5th tributary:	
	6th tributary:	
	7th tributary:	
	8th tributary:	
	9th tributary:	
	Total Adjusted Production Area:	**29517.57**

Resident Cutthroat/ Rainbow trout	Primary Stream:	33375.82
Adjusted Production Area:	1st tributary:	

	2nd tributary:	
	3rd tributary:	
	4th tributary:	
	5th tributary:	
	6th tributary:	
	7th tributary:	
	8th tributary:	
	9th tributary:	
	Total Adjusted Production Area:	**33375.82**
Coho	Primary Stream:	29517.57
Adjusted Production Area:	1st tributary:	
	2nd tributary:	
	3rd tributary:	
	4th tributary:	
	5th tributary:	
	6th tributary:	
	7th tributary:	
	8th tributary:	
	9th tributary:	
	Total Adjusted Production Area:	**29517.57**
Steelhead	Primary Stream:	29517.57
Adjusted Production Area:	1st tributary:	
	2nd tributary:	
	3rd tributary:	
	4th tributary:	
	5th tributary:	
	6th tributary:	
	7th tributary:	
	8th tributary:	
	9th tributary:	
	Total Adjusted Production Area:	**29517.57**

WDFW-SSHEAR PHYSICAL SURVEY OF POTENTIAL HABITAT

UPSTREAM SURVEY COMMENTS

Stream Name:	Quilcene River	**Date:**	9/9/03
Tributary To:	Hood Canal	**Observers:**	Lantz, Tschaekofske, Gearns
WRIA #:	17.0012	**Section Survey:**	US of hatchery weir to natural
Sample Frequency:	60m/320m		waterfall barrier.
Filename:	1310028.xls		

Hip Chain	Comment
0	US end of electric weir, barrier to adult and juvenile salmonid passage- pushed sample US beyond hatchery influence.
37	Unnaturally pooled up because of dam influence for 36m. Outlet for upstream hatchery intake pours water back into the Quilcene river here, forming a LB side channel.
121	Began sampling, now out of hatchery influence. Hwy 101 next to RB side, hatchery facilities on LB. Riparian canopy mostly alders, almost no LWD in channel.
190	Nice pool w/about 20 juvenile salmonids, look like coho. RB rip rap barbs to prevent bank erosion periodically. Built by hatchery.
215	LB rip rapped, and almost no tree coverage here.
314	Some bedrock on RB, water gauge here. RB steep hillside up to 101. LB floodplain has opened up a bit, lower. Mixed canopy, mostly alders and bigleaf maple.
327	Sample.
407	LB cement wall embankment to prevent erosion at private residence. Small braid RB. Gravel bar here w/small alders growing.
439	Floodplain more open as stream moves away from 101. Canopy approx 20%, mostly alders, willow, bigleaf maple.
530	RB side channel- cuts around back side of upper dike for hatchery.
551	Some spawning gravel here.
588	LWD jam in RB side channel- pool forming feature. Huge gravel bar splits stream, with lots of cobble/boulders on bar. LB scoured. Stream flows very low here- partially due to dewatering of stream because of upstream hatchery intake and dam.
654	Sample.
715	Huge pool, max depth 3m. Main side channel comes back into mainstem 15m above this point. Engineered LWD controls placed along LB, and on side channel. LB also rip rapped for erosion control. Intake structure for hatchery is approx 100m upstream on mainstem. Floodplain still wide open.
799	Old hatchery intake on LB, no longer used. Pool forming at this point.
861	Current hatchery intake on LB side, next to dam and fish ladder. Currently water only flows through the fish ladder, and intake pipe. Stream below dam is partially dewatered. An engineered dike runs along the RB upstream of this structure- it is a permeable concrete dike. LWD has been placed along the top of the dike.
884	RB rip rapped along dike, currently covered with earth, LWD.
924	Small log jam
953	Cement pad for dike exposed , only LWD covering top.
994	Stream splits and half flows through dike here, lots of LWD in this side channel below the dike. Hatchery has begun passing adult coho, and we saw many converging at this point the following day.
1000	Reach break, because large RB trib enters mainstem here.
1292	Sample. Walked up to this point past numerous side channels on RB side until the stream joined back up into one channel. Fairly large gravel bars here, spanning 100m or more in some places. Floodplain wide open- during high flows it must spread out here. LB wall scoured up 3m high for approx 30m. Our OHW measurements might be a little conservative in this area.
1479	Stream narrows. Sporadic LWD piles on banks.
1612	Sample
1616	LB trib, extremely steep gradient, no water currently.
1649	Rip rapped engineered barbs on RB, in front of residences.
1674	RB culvert pops out next to river, set higher on floodplain and has no water currently.
1774	2 more rip rapped barbs, approx 20m apart on RB.
1802	Small cascades for 30m, 3-5% gradient. Saw a juvenile trout. Canopy 30-40%, mostly mixed vine leaf maple, bigleaf maple, western hemlock, alder, red cedar. More confined floodplain.
1932	Sample
2035	LB trib, low gradient, dry, mostly cobble/gravel.
2202	Old footbridge spans creek, about 10m high. Canopy about 60% here; little to no LWD in channel.
2252	Sample

2313	RB bedrock substrate, more confined. Pool for 25m, then cascades up above.
2366	Small RB trib, w/huge fallen tree over junction with mainstem. Trib OHW about 1m, some water currently.
2470	RB seepage. Bedrock on both banks. Mostly long riffles with high velocity pools occasionally. Gradient 1.5% here. Some large sitka spruce off channel.
2514	Tiny RB trib, .20m wide.
2573	Sample
2650	Small RB trib, high gradient. Canopy about 70% now, more conifers. Large boulders beginning to show up.
2665	LWD RB and LB, mostly cedars. Some seepage on banks here.
2806	Very deep pool.
2811	LB seepage.
2861	Big pool, rapids above
2880	LB seepage.
2893	Reach break, due to confinement and substrate changes. Sample.
2916	Huge pool next to sheer rock wall about 60m tall on RB.
3015	Large pool.
3113	LB sheer rock waterfall down 30m wall, from LB trib. Falls View Campground is above this point on RB.
3174	RB trib, moderate gradient with some water running now. Flows through hiking trail below Falls View Campground.
3213	Sample
3227	LWD RB- pool forming feature. LB bedrock substrate, sheer walls. Occasional patches of spawning gravel.
3505	Exposed bedrock on parts of stream bottom.
3533	Sample.
3549	Half of stream bottom is bedrock here. Canopy tighter, 70-80%. Mostly mixed conifers. Confined channel, no juvenile sightings.
3596	Gradient increasing, run of rapids here.
3599	Reach break due to 3% gradient. Sample.
3694	LB trib w/water.
3769	Very deep pool, at least 3m deep. Right below 5% gradient rapids
3919	Reach break due to 5% gradient, and boulders avg. over 1m x 1m. LWD piles here, some have diameters greater than .7m. Young sitka spruce regrowth on RB and LB. Canyon walls less confined here. Sample.
3963	Boulders here larger than 2m x 2m. LWD jams RB and LB.
4013	Huge pool, 40m x 20m wide, 3m deep with small waterfall (1m) above.
4137	Gradient 5.6%, very confined again.
4177	Saw 3 6" trout in pool.
4252	Reach break due to gradient decrease, 2.5%. Smaller boulders here. Sample.
4317	Nice patch of spawning gravel.
4460	LWD RB and LB.
4637	RB seepage.
4710	Small patch spawning gravel.
4877	Gradient beginning to increase, some rapids.
4892	Sample.
4998	4m deep pool with bedrock shelf under water.
5213	Sample. Rainbow Campground trail comes out on RB at this point.
5267	RB Elbo Cr.enters mainstem. Elbo Cr has high gradient, 10-15%, and the mouth is piled up with boulders and LWD. Some water running subsurface under this pile. 60m upstream on Elbo there is a waterfall over 3m high that would be a natural barrier to anadromous fish. The creek is not 20% of the mainstem flows, so we didn't break reach.
5332	Small trout, 5".
5390	Small RB trib. Gradient increasing, confinement increasing. Canopy down to 40%
5427	Reach break due 3-4% gradient, and confinement increase. Boulders up to 1m x 1m again.
5486	RB trib running down sheer wall. Large pool spanning stream, confinement made it difficult to get past this point. Scaled the wall to get past.

5584	Hit natural barrier waterfall composed of huge boulders and LWD piles. Large pool in front made it impossible for us to go any further. The first drop was 4.2 m, and the second drop was another 1.3m. Since we could not physically check around the boulders, there may be a hidden way through the boulders, but it is still almost a complete barrier to fish passage. Hipchain measurements stopped at this point, but we continued up and around the mainstem, dropping in at Mile and a Half Cr. From that point we were able to continue upstream and downstream until we hit natural barriers in both directions. The downstream waterfall was a 3.5m drop, and was located approximately 100m upstream of our hipchain stopping point. The upstream barrier was a couple pieces of LWD, 1m diameter, wedged between the canyon walls and a pile of boulders. The drop was 2.5- 3m high, with very high velocity flows coming over.
5584 cont…	The historic natural barrier sheer rock waterfall for the Big Quilcene is located approximately 200m up beyond this LWD falls where we could get no further. Coming down Mile and a Half Cr, we found a 26m sheer rock waterfall about 150m upstream from where it enters the Quilcene.

WDFW-SSHEAR PHYSICAL SURVEY OF POTENTIAL HABITAT
DOWNSTREAM CHECK COMMENTS

Stream Name:	Big Quilcene River	**Date:**	9/9/03
Tributary To:	Hood Canal	**Observers:**	Lantz, Tschaekofske, Gearns
WRIA #:	17.0012	**Section surveyed:**	DS of hatchery weir to Hood Canal
Filename:	1310028.xls		
		DS Check Length (m):	4506

Hip Chain	Comment
0	The downstream check on the Big Quilcene River was not necessary as it has been verified free of barriers. There are 2 bridge crossings downstream of the weir: one on Highway 101, and one on Linger Longer Rd.

WDF&W - SSHEAR

PHYSICAL SURVEY OF POTENTIAL HABITAT (Ver. 4c)

Stream Name:	Big Quilcene R	**Date:**	9/9/2003
Tributary To:	Hood Canal	**Observer(s):**	Lantz, Tschaekofske, Gearns
WRIA #:	17.0012	**Section surveyed:**	US of hatchery weir to natural
Sample Frequency:	60m/320m		waterfall barrier
Survey Method:	FS	**Filename:**	1310028.xls

Summary of Information - Total Stream Length

Total Length Surveyed:	5584.00 m	Tot. Length Culverted:	0.00 m
Total Length Sampled:	1022.00 m	Percent of Stream Length	
Percent Sampled:	18.30 %	Culverted:	0.00 %

Measured Pool Area:	25690.66 m²
Measured Riffle Area	26479.64 m²
Measured Rapid Area:	15165.30 m²
Measured Pond Area:	0.00 m²
Total Measured Stream Area:	**67335.60 m²**

Total Spawning Area:	**13766.39 m²**
Total Rearing Area:	**33375.82 m²**

POOL : RIFFLE : RAPID : POND RATIO (%)

Pool= 38.15 Riffle= 39.32 Rapid= 22.52 Pond= 0.00

PRODUCTION AREA CALCULATIONS

	Sockeye	Chum	Pink	Coho	SR Cutthroat	Chinook	Steelhead	Res CT/RB	Bull	Brook	Brown
Reach 1	0.00	5383.04	5383.04	7500.39	7500.39	0.00	7500.39	7500.39	0.00	0.00	0.00
Reach 2	0.00	4402.71	4402.71	11690.03	11690.03	0.00	11690.03	11690.03	0.00	0.00	0.00
Reach 3	0.00	0.00	1169.02	3214.74	3214.74	0.00	3214.74	3214.74	0.00	0.00	0.00
Reach 4	0.00	0.00	0.00	1561.50	1561.50	0.00	1561.50	1561.50	0.00	0.00	0.00
Reach 5	0.00	0.00	0.00	2587.16	2587.16	0.00	2587.16	2587.16	0.00	0.00	0.00
Reach 6	0.00	0.00	0.00	6046.77	6046.77	0.00	6046.77	6046.77	0.00	0.00	0.00
Reach 7	0.00	0.00	0.00	775.22	775.22	0.00	775.22	775.22	0.00	0.00	0.00
Reach 8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reach 9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reach 10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total area*	0.00	9785.75	10954.77	33375.82	33375.82	0.00	33375.82	33375.82	0.00	0.00	0.00

** Spawning habitat used for sockeye, chum and pink, rearing used for all other species.*

ADJUSTED PRODUCTION AREAS

	Sockeye	Chum	Pink	Coho	SR Cutthroat	Chinook	Steelhead	Res CT/RB	Bull	Brook	Brown
Reach 1	0.00	4467.92	4467.92	6633.35	6633.35	0.00	6633.35	7500.39	0.00	0.00	0.00
Reach 2	0.00	3654.25	3654.25	10338.66	10338.66	0.00	10338.66	11690.03	0.00	0.00	0.00
Reach 3	0.00	0.00	1169.02	2843.11	2843.11	0.00	2843.11	3214.74	0.00	0.00	0.00
Reach 4	0.00	0.00	0.00	1380.99	1380.99	0.00	1380.99	1561.50	0.00	0.00	0.00
Reach 5	0.00	0.00	0.00	2288.09	2288.09	0.00	2288.09	2587.16	0.00	0.00	0.00
Reach 6	0.00	0.00	0.00	5347.77	5347.77	0.00	5347.77	6046.77	0.00	0.00	0.00
Reach 7	0.00	0.00	0.00	685.61	685.61	0.00	685.61	775.22	0.00	0.00	0.00
Reach 8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reach 9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reach 10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total area*	0.00	8122.17	9291.19	29517.57	29517.57	0.00	29517.57	33375.82	0.00	0.00	0.00

Summary of Information - Reach #1

Starting Position:	US side of hatchery weir	Length of Reach Culverted:	0.00 m
Length of Reach:	1000.00 m	Percent of Reach Culverted	0.0 %
Length Sampled:	180.00 m	Estimated drainage area:	59.76 mi²

Canopy:	20%, mostly alders, willows, mixed deciduous shrubs
Instream Cover:	medium
Juv. Abundance:	low
Limiting Factors:	substrate, channel morphology
Barrier Site ID:	1310028

Spring influences are (see below): 1

(absent-0, slight-1, mod.-2, pronounced-3)

1.) relatively regular, rectangular cross-section, minor variations in depth

2.) Poorly defined bars and thalweg / very low, flat floodplain

3.) bank vegetation along a distinct line, at a small distance above the H2O surface; moss on exposed surfaces of rocks

Reg. Constant (for 60-d low flow calc.): 1.04

Olympic/Coastal = 0.49

Cascade/E. Puget = 1.04

Columbia/E. WA=0.12

Northern/NE Mts.=0.097

Species Expected to Benefit

Sockeye	no	Coho	yes	Steelhead	yes	Res CT/RB	yes	Brook	no
Chum	yes	SR Cutthroat	yes			Bull	no	Brown	no
Pink	yes	Chinook	no						

Pool : Riffle : Rapid : Pond Ratio (%)

Pool= 26.24 Riffle= 73.76 Rapid= 0.00 Pond= 0.00

Pool L sampled:	46.00 m	Pool Gravel %:	41.25
Riffle L sampled:	134.00 m	Riffle Gravel %:	30.00
Rapid L sampled:	0.00 m	Rapid Gravel %:	0.00
Pond L sampled:	0.00 m	Pond Gravel %:	0.00
Ave. Pool Depth:	0.95 m	Flow:	cfs
Ave. Riffle Depth:	0.233 m	Ave. Grad.:	130.00 %
Ave. Rapid Depth:	0.00 m	Ave. Temp:	0.0 °C
Ave. Pond Depth:	0.00 m	T @ trib.:	0.0 °C

Substrate Composition (% Boulder= 9.29 Rubble= 37.14 Gravel= 36.43 Sand= 17.14

Wetted (Measured) Area

Ave. Pool Width:	14.13 m	Pool Area (W)	3609.72 m²
Ave. Riffle Width:	13.633 m	Riffle Area (W):	10149.26 m²
Ave. Rapid Width:	0.00 m	Rapid Area (W):	0.00 m²
Ave. Pond Width:	0.00 m	Pond Area (W):	0.00 m²
		Total Reach Area(W):	**13758.98 m²**

Ordinary High Water Area

Ave. Pool W(OHW):	20.85 m	Pool Area (OHW):	5328.33 m²
Ave. Riffle W(OHW):	26.13 m	Riffle Area (OHW):	19454.81 m²
Ave. Rapid W(OHW):	0.00 m	Rapid Area (OHW):	0.00 m²
Ave. Pond W(OHW):	0.00 m	Pond Area (OHW):	0.00 m²
		Total Reach Area(OHW):	**24783.15 m²**

60-day Low Flow Area

60-day Low Flow:	1.759 cfs	Pool Area (60dLF):	3242.15 m²
Low-Flow Depth:	0.158 m	Riffle Area (60dLF):	7952.47 m²
Low-Flow Width:	9.21 m	Rapid Area (60dLF):	0.00 m²
		Pond Area (60dLF):	0.00 m²
Pool Factor:	0.85		
Riffle/Rapid Factor:	0.68	**Total Reach Area (60dLF):**	**11194.62 m²**
Pond Factor:	1.00		

QUALITY MODIFIERS:

spawning:	0.67	**Spawning Area:**	**5383.04 m²**
rearing:	0.67	**Rearing Area:**	**7500.39 m²**

Summary of Information - Reach #2

Starting Position:	RB trib confluence	Length of Reach Culverted:	0.00 m
Length of Reach:	1893.00 m	Percent of Reach Culverted	0.0 %
Length Sampled:	300.00 m	Estimated drainage area:	59.12 mi²

Canopy:	60%, mostly mixed deciduous forest, with some cedar, doug fir, hemlock
Instream Cover:	medium
Juv. Abundance:	low
Limiting Factors:	substrate, channel morphology
Barrier Site ID:	1310028

Spring influences are (see below):	1	Reg. Constant (for 60-d low flow calc.):	1.04
(absent-0, slight-1, mod-2, pronounced-3)		*Olympic / Coastal = 0.49*	
1.)Relatively regular, rectangular cross-section, minor variations in depth		*Cascade / E. Puget = 1.04*	
2.)Poorly defined bars and thalweg		*Columbia / E. WA = 0.12*	
3.)Bank vegetation along a distinct line, at a small distance above the H2O surface; moss on exposed surfaces of rocks		*Northern / NE Mts. = 0.097*	

Species Expected to Benefit

Sockeye	no	Coho	yes	Steelhead	yes	Res CT/RB	yes	Brook	no
Chum	yes	SR Cutthroat	yes			Bull	no	Brown	no
Pink	yes	Chinook	no						

Pool : Riffle : Rapid : Pond Ratio (%)

Pool= 28.37 Riffle= 58.55 Rapid= 13.08 Pond= 0.00

Pool L sampled:	85.00 m	Pool Gravel %:	28.75
Riffle L sampled:	175.00 m	Riffle Gravel %:	18.00
Rapid L sampled:	40.00 m	Rapid Gravel %:	10.00
Pond L sampled:	0.00 m	Pond Gravel %:	0.00
Ave. Pool Depth:	0.44 m	Flow:	cfs
Ave. Riffle Depth:	0.31 m	Ave. Grad.:	68.00 %
Ave. Rapid Depth:	0.24 m	Ave. Temp:	0.0 °C
Ave. Pond Depth:	0.00 m	T @ trib.:	0.0 °C

Substrate Composition (% Boulder = 26.00 Rubble = 44.50 Gravel = 21.50 Sand = 8.00

Wetted (Measured) Area

Ave. Pool Width:	12.55 m	Pool Area (W)	6731.19 m²
Ave. Riffle Width:	12.58 m	Riffle Area (W):	13891.47 m²
Ave. Rapid Width:	12.30 m	Rapid Area (W):	3104.52 m²
Ave. Pond Width:	0.00 m	Pond Area (W):	0.00 m²
		Total Reach Area (W):	**23727.18 m²**

Ordinary High Water Area

Ave. Pool W(OHW):	16.43 m	Pool Area (OHW):	8809.55 m²
Ave. Riffle W(OHW):	18.54 m	Riffle Area (OHW):	20472.80 m²
Ave. Rapid W(OHW):	14.00 m	Rapid Area (OHW):	3533.60 m²
Ave. Pond W(OHW):	0.00 m	Pond Area (OHW):	0.00 m²
		Total Reach Area(OHW):	**32815.94 m²**

60-day Low Flow Area

60-day Low Flow:	1.740 cfs	Pool Area (60dLF):	4688.24 m²
Low-Flow Depth:	0.194 m	Riffle Area (60dLF):	10428.88 m²
Low-Flow Width:	7.88 m	Rapid Area (60dLF):	2330.69 m²
		Pond Area (60dLF):	0.00 m²
Pool Factor	0.54		
Riffle/Rapid Factor:	0.63	**Total Reach Area (60dLF):**	**17447.80 m²**
Pond Factor:	1.00		

QUALITY MODIFIERS:			
spawning:	0.67	**Spawning Area:**	**4402.71 m²**
rearing:	0.67	**Rearing Area:**	**11690.03 m²**

Summary of Information - Reach #3

Starting Position:	Confinement increase, more boulders	Length of Reach Culverted:	0.00 m
Length of Reach:	706.00 m	Percent of Reach Culverted	0.0 %
Length Sampled:	148.00 m	Estimated drainage area:	57.8 mi²

Canopy:	70%, mostly mixed conifers, some alder,bigleaf maple
Instream Cover:	high
Juv. Abundance:	none observed
Limiting Factors:	substrate, channel morphology
Barrier Site ID:	1310028

Spring influences are (see below):	1	Reg. Constant (for 60-d low flow calc.):	1.04
(absent-0, slight-1, mod.-2, pronounced-3)		*Olympic / Coastal = 0.49*	
1.)Relatively regular, rectangular cross-section, minor variations in depth		*Cascade / E. Puget = 1.04*	
2.)Poorly defined bars and thalweg		*Columbia / E. WA = 0.12*	
3.)Bank vegetation along a distinct line, at a small distance above the H2O distance; moss on exposed surfaces of rocks		*Northern / NE Mts. = 0.097*	

Species Expected to Benefit

Sockeye	no	Coho	yes	Steelhead	yes	Res CT/RB	yes	Brook	no
Chum	no	SR Cutthroat	yes			Bull	no	Brown	no
Pink	yes	Chinook	no						

Pool : Riffle : Rapid : Pond Ratio (%)

Pool= 70.62 Riffle= 6.09 Rapid= 23.29 Pond= 0.00

Pool L sampled:	106.00 m	Pool Gravel %:	18.33
Riffle L sampled:	10.00 m	Riffle Gravel %:	20.00
Rapid L sampled:	32.00 m	Rapid Gravel %:	11.67
Pond L sampled:	0.00 m	Pond Gravel %:	0.00
Ave. Pool Depth:	0.79 m	Flow:	cfs
Ave. Riffle Depth:	0.37 m	Ave. Grad.:	240.00 %
Ave. Rapid Depth:	0.34 m	Ave. Temp:	0.0 °C
Ave. Pond Depth:	0.00 m	T @ trib.:	0.0 °C

Substrate Composition (% Boulder = 37.73 Rubble = 22.27 Gravel = 16.82 Sand = 23.18

Wetted (Measured) Area

Ave. Pool Width:	10.83 m	Pool Area (W)	5477.86 m²
Ave. Riffle Width:	9.90 m	Riffle Area (W):	472.26 m²
Ave. Rapid Width:	11.83 m	Rapid Area (W):	1806.34 m²
Ave. Pond Width:	0.00 m	Pond Area (W):	0.00 m²
		Total Reach Area (W):	**7756.46 m²**

Ordinary High Water Area

Ave. Pool W(OHW):	13.90 m	Pool Area (OHW):	7028.52 m²
Ave. Riffle W(OHW):	16.40 m	Riffle Area (OHW):	782.32 m²
Ave. Rapid W(OHW):	16.83 m	Rapid Area (OHW):	2569.59 m²
Ave. Pond W(OHW):	0.00 m	Pond Area (OHW):	0.00 m²
		Total Reach Area(OHW):	**10380.43 m²**

60-day Low Flow Area

60-day Low Flow:	1.701 cfs	Pool Area (60dLF):	3547.66 m²
Low-Flow Depth:	0.118 m	Riffle Area (60dLF):	259.16 m²
Low-Flow Width	3.20 m	Rapid Area (60dLF):	991.28 m²
		Pond Area (60dLF):	0.00 m²
Pool Factor:	0.47		
Riffle/Rapid Factor	0.32	**Total Reach Area (60dLF):**	**4798.11 m²**
Pond Factor:	1.00		

QUALITY MODIFIERS:			
spawning:	0.67	**Spawning Area:**	**1169.02 m²**
rearing:	0.67	**Rearing Area:**	**3214.74 m²**

Summary of Information - Reach #4

Starting Position:	Gradient increase to 3%	Length of Reach Culverted:	0.00 m
Length of Reach:	320.00 m	Percent of Reach Culverted	0.0 %
Length Sampled:	51.00 m	Estimated drainage area:	55.85 mi²

Canopy:	70%, mostly mixed conifer, and alder, bigleaf maple
Instream Cover:	high
Juv. Abundance:	none observed
Limiting Factors:	substrate, channel morphology
Barrier Site ID:	1310028

Spring influences are (see below):	1	Reg. Constant (for 60-d low flow calc.):	1.04
(absent-0, slight-1, mod.-2, pronounced-3)		*Olympic / Coastal = 0.49*	
1.)Relatively regular, rectangular cross-section, minor variations in depth		*Cascade / E. Puget = 1.04*	
2.)Poorly defined bars and thalweg		*Columbia / E. WA = 0.12*	
3.)Bank vegetation along a distinct line, at a small distance above the H2O surface; moss on exposed surfaces of rocks		*Northern / NE Mts. = 0.097*	

Species Expected to Benefit

Sockeye	no	Coho	yes	Steelhead	yes	Res CT/RB	yes	Brook	no
Chum	no	SR Cutthroat	yes			Bull	no	Brown	no
Pink	no	Chinook	no						

Pool : Riffle : Rapid : Pond Ratio (%)

Pool= 64.71 Riffle= 0.00 Rapid= 35.29 Pond= 0.00

Pool L sampled:	36.00 m	Pool Gravel %:	17.50
Riffle L sampled:	0.00 m	Riffle Gravel %:	0.00
Rapid L sampled:	15.00 m	Rapid Gravel %:	7.50
Pond L sampled:	0.00 m	Pond Gravel %:	0.00
Ave. Pool Depth:	0.53 m	Flow:	cfs
Ave. Riffle Depth:	0.00 m	Ave. Grad.:	300.00 %
Ave. Rapid Depth:	0.40 m	Ave. Temp:	0.0 °C
Ave. Pond Depth:	0.00 m	T @ trib.:	0.0 °C

Substrate Composition (% Boulder = 52.50 Rubble = 27.50 Gravel = 12.50 Sand = 7.50

Wetted (Measured) Area

Ave. Pool Width:	8.10 m	Pool Area (W)	1829.65 m²
Ave. Riffle Width:	0.00 m	Riffle Area (W):	0.00 m²
Ave. Rapid Width:	10.60 m	Rapid Area (W):	997.65 m²
Ave. Pond Width:	0.00 m	Pond Area (W):	0.00 m²
		Total Reach Area (W):	**2827.29 m²**

Ordinary High Water Area

Ave. Pool W(OHW):	12.20 m	Pool Area (OHW):	2755.76 m²
Ave. Riffle W(OHW):	0.00 m	Riffle Area (OHW):	0.00 m²
Ave. Rapid W(OHW):	14.50 m	Rapid Area (OHW):	1364.71 m²
Ave. Pond W(OHW):	0.00 m	Pond Area (OHW):	0.00 m²
		Total Reach Area(OHW):	**4120.47 m²**

60-day Low Flow Area

60-day Low Flow:	1.64 cfs	Pool Area (60-dLF):	1585.69 m²
Low-Flow Depth:	#DIV/0! m	Riffle Area (60-dLF):	0.00 m²
Low-Flow Width:	#DIV/0! m	Rapid Area (60-dLF):	744.91 m²
		Pond Area (60-dLF):	0.00 m²

Pool Factor:	0.80		
Riffle/Rapid Factor:	0.62	**Total Reach Area (60dLF):**	**2330.60 m²**
Pond Factor:	1.00		

QUALITY MODIFIERS:			
spawning:	0.67	**Spawning Area:**	**391.69 m²**
rearing:	0.67	**Rearing Area:**	**1561.50 m²**

Summary of Information - Reach #5

Starting Position:	Gradient increase to 5%	Length of Reach Culverted:	0.00 m
Length of Reach:	333.00 m	Percent of Reach Culverted	0.0 %
Length Sampled:	43.00 m	Estimated drainage area:	55.54 mi²

Canopy:	70%, mixed conifers with alder, bigleaf maple
Instream Cover:	high
Juv. Abundance:	low
Limiting Factors:	substrate, channel morphology
Barrier Site ID:	1310028

Spring influences are (see below):	1	Reg. Constant (for 60-d low flow calc.):	1.04
(absent-0, slight-1, mod.-2, pronounced-3)		*Olympic / Coastal = 0.49*	
1.)Relatively regular, rectangular cross-section, minor variations in depth		*Cascade / E. Puget = 1.04*	
2.)Poorly defined bars and thalweg		*Columbia / E. WA = 0.12*	
3.)Bank vegetation along a distinct line, at a small distance above the H2O surface; moss on exposed surfaces of rocks		*Northern / NE Mts. = 0.097*	

Species Expected to Benefit

Sockeye	no	Coho	yes	Steelhead	yes	Res CT/RB	yes	Brook	no
Chum	no	SR Cutthroat	yes			Bull	no	Brown	no
Pink	no	Chinook	no						

Pool : Riffle : Rapid : Pond Ratio (%)

Pool= 40.17 Riffle= 0.00 Rapid= 59.83 Pond= 0.00

Pool L sampled:	16.00 m	Pool Gravel %:	12.50
Riffle L sampled:	0.00 m	Riffle Gravel %:	0.00
Rapid L sampled:	27.00 m	Rapid Gravel %:	7.50
Pond L sampled:	0.00 m	Pond Gravel %:	0.00
Ave. Pool Depth:	0.68 m	Flow:	cfs
Ave. Riffle Depth:	0.00 m	Ave. Grad.	500.00 %
Ave. Rapid Depth:	0.57 m	Ave. Temp:	0.0 °C
Ave. Pond Depth:	0.00 m	T @ trib.:	0.0 °C

Substrate Composition (% Boulder = 50.00 Rubble = 21.25 Gravel = 10.00 Sand = 18.75

Wetted (Measured) Area

Ave. Pool Width:	15.75 m	Pool Area (W)	1951.53 m²
Ave. Riffle Width:	0.00 m	Riffle Area (W):	0.00 m²
Ave. Rapid Width:	13.90 m	Rapid Area (W):	2906.39 m²
Ave. Pond Width:	0.00 m	Pond Area (W):	0.00 m²
		Total Reach Area (W):	**4857.93 m²**

Ordinary High Water Area

Ave. Pool W(OHW):	17.65 m	Pool Area (OHW):	2186.96 m²
Ave. Riffle W(OHW):	0.00 m	Riffle Area (OHW):	0.00 m²
Ave. Rapid W(OHW):	15.60 m	Rapid Area (OHW):	3261.85 m²
Ave. Pond W(OHW):	0.00 m	Pond Area (OHW):	0.00 m²
		Total Reach Area(OHW):	**5448.81 m²**

60-day Low Flow Area

60-day Low Flow:	1.63	cfs	Pool Area (60dLF):	1691.33	m²
Low-Flow Depth:	#DIV/0!	m	Riffle Area 960dLF):	0.00	m²
Low-Flow Width:	#DIV/0!	m	Rapid Area (60dLF):	2170.11	m²
			Pond Area (60dLF):	0.00	m²
Pool Factor:	0.80				
Riffle/Rapid Factor:	0.62		**Total Reach Area (60dLF):**	**3861.44**	**m²**
Pond Factor:	1.00				

QUALITY MODIFIERS:

spawning:	0.67	**Spawning Area:**	**347.07**	**m²**
rearing:	0.67	**Rearing Area:**	**2587.16**	**m²**

Summary of Information - Reach #6

Starting Position:	Gradient decrease to 2.5%	Length of Reach Culverted:	0.00 m
Length of Reach:	1175.00 m	Percent of Reach Culverted	0.0 %
Length Sampled:	240.00 m	Estimated drainage area:	55.45 mi²

Canopy:	50%, mostly mixed conifers
Instream Cover:	high
Juv. Abundance:	low
Limiting Factors:	substrate, channel morphology
Barrier Site ID:	1310028

Spring influences are (see below):	1	Reg. Constant (for 60-d low flow calc.):	1.04
(absent-0, slight-1, mod.-2, pronounced-3)		*Olympic / Coastal = 0.49*	
1.)Relatively regular, rectangular cross-section, minor variations in depth		*Cascade / E. Puget = 1.04*	
2.)Poorly defined bars and thalweg		*Columbia / E. WA = 0.12*	
3.)Bank vegetation along a distinct line, at a small distance above the H2O surface; moss on exposed surfaces of rocks		*Northern / NE Mts. = 0.097*	

Species Expected to Benefit

Sockeye	no	Coho	yes	Steelhead	yes	Res CT/RB	yes	Brook	no
Chum	no	SR Cutthroat	yes			Bull	no	Brown	no
Pink	no	Chinook	no						

Pool : Riffle : Rapid : Pond Ratio (%)

Pool= 39.77 Riffle= 15.12 Rapid= 45.11 Pond= 0.00

Pool L sampled:	101.00 m	Pool Gravel %:	23.00
Riffle L sampled:	39.00 m	Riffle Gravel %:	10.00
Rapid L sampled:	100.00 m	Rapid Gravel %:	12.50
Pond L sampled:	0.00 m	Pond Gravel %:	0.00
Ave. Pool Depth:	0.73 m	Flow:	cfs
Ave. Riffle Depth:	0.25 m	Ave. Grad.:	265.00 %
Ave. Rapid Depth:	0.31 m	Ave. Temp:	0.0 °C
Ave. Pond Depth:	0.00 m	T @ trib.:	0.0 °C

Substrate Composition (% Boulder = 37.92 Rubble = 32.08 Gravel = 16.67 Sand = 13.33

Wetted (Measured) Area

Ave. Pool Width:	10.46 m	Pool Area (W)	5172.25	m²
Ave. Riffle Width:	10.30 m	Riffle Area (W):	1966.66	m²
Ave. Rapid Width:	11.98 m	Rapid Area (W):	5866.84	m²
Ave. Pond Width:	0.00 m	Pond Area (W):	0.00	m²
		Total Reach Area(W):	**13005.75**	**m²**

Ordinary High Water Area

Ave. Pool W(OHW):	14.18 m	Pool Area (OHW):	7011.71	m²
Ave. Riffle W(OHW):	15.10 m	Riffle Area (OHW):	2883.16	m²
Ave. Rapid W(OHW):	14.47 m	Rapid Area (OHW):	7082.64	m²
Ave. Pond W(OHW):	0.00 m	Pond Area (OHW):	0.00	m²

		Total Reach Area(OHW):	**16977.51 m²**

60-day Low Flow Area

60-day Low Flow:	1.632 cfs	Pool Area (60dLF):	4013.96 m²
Low-Flow Depth:	0.115 m	Riffle Area (60-dLF):	1258.07 m²
Low-Flow Width:	4.73 m	Rapid Area (60-dLF):	3753.01 m²
		Pond Area (60-dLF):	0.00 m²
Pool Factor:	0.66		
Riffle/Rapid Factor:	0.46	**Total Reach Area (60-dLF):**	**9025.03 m²**
Pond Factor:	1.00		

QUALITY MODIFIERS:			
spawning:	0.67	**Spawning Area:**	**1866.85 m²**
rearing:	0.67	**Rearing Area:**	**6046.77 m²**

Summary of Information - Reach #7

Starting Position:	Gradient increase 3-4%, increased confinement	Length of Reach Culverted:	0.00 m
Length of Reach:	157.00 m	Percent of Reach Culverted	0.0 %
Length Sampled:	60.00 m	Estimated drainage area:	54.35 mi²

Canopy:	60%, mixed conifers on sheer walls
Instream Cover:	high
Juv. Abundance:	none observed
Limiting Factors:	substrate, channel morphology
Barrier Site ID	1310028

Spring influences are (see below):	1	Reg. Constant (for 60-d low flow calc.):	1.04
(absent-0, slight-1, mod.-2, pronounced-3)		*Olympic / Coastal = 0.49*	
1.)Relatively regular, rectangular cross-section, minor variations in depth		*Cascade / E. Puget = 1.04*	
2.)Poorly defined bars and thalweg		*Columbia / E. WA = 0.12*	
3.)Bank vegetation along a distinct line, at a small distance above the H2O surface; moss on exposed surfaces of rocks		*Northern / NE Mts. = 0.097*	

Species Expected to Benefit

Sockeye	no	Coho	yes	Steelhead	yes	Res CT/RB	yes	Brook	no
Chum	no	SR Cutthroat	yes			Bull	no	Brown	no
Pink	no	Chinook	no						

Pool : Riffle : Rapid : Pond Ratio (%)

Pool= 65.51 Riffle= 0.00 Rapid= 34.49 Pond= 0.00

Pool L sampled:	36.00 m	Pool Gravel %:	25.00
Riffle L sampled:	0.00 m	Riffle Gravel %:	0.00
Rapid L sampled:	24.00 m	Rapid Gravel %:	5.00
Pond L sampled:	0.00 m	Pond Gravel %:	0.00
Ave. Pool Depth:	1.05 m	Flow:	cfs
Ave. Riffle Depth:	0.00 m	Ave. Grad.:	400.00 %
Ave. Rapid Depth:	0.40 m	Ave. Temp:	0.0 °C
Ave. Pond Depth:	0.00 m	T @ trib.:	0.0 °C

Substrate Composition (% Boulder = 46.25 Rubble = 23.75 Gravel = 15.00 Sand = 15.00

Wetted (Measured) Area

Ave. Pool Width:	9.75 m	Pool Area (W)	918.45 m²
Ave. Riffle Width:	0.00 m	Riffle Area (W):	0.00 m²
Ave. Rapid Width:	7.70 m	Rapid Area (W):	483.56 m²
Ave. Pond Width:	0.00 m	Pond Area (W):	0.00 m²
		Total Reach Area (W):	**1402.01 m²**

Ordinary High Water Area

Ave. Pool W(OHW):	11.55	m	Pool Area (OHW):	1088.01	m²
Ave. Riffle W(OHW):	0.00	m	Riffle Area (OHW):	0.00	m²
Ave. Rapid W(OHW):	11.30	m	Rapid Area (OHW):	709.64	m²
Ave. Pond W(OHW):	0.00	m	Pond Area (OHW):	0.00	m²
			Total Reach Area(OHW):		**1797.65 m²**

60-day Low Flow Area

60-day Low Flow:	1.600	cfs	Pool Area (60dLF):	795.99	m²
Low-Flow Depth:	#DIV/0!	m	Riffle Area (60dLF):	0.00	m²
Low-Flow Width:	#DIV/0!	m	Rapid Area (60dLF):	361.06	m²
			Pond Area (60-dLF):	0.00	m²
Pool Factor:	0.80				
Riffle/Rapid Factor:	0.62		**Total Reach Area (60dLF):**		**1157.05 m²**
Pond Factor:	1.00				

QUALITY MODIFIERS:				
spawning:	0.67	**Spawning Area:**	**206.01**	**m²**
rearing:	0.67	**Rearing Area:**	**775.22**	**m²**